



A Physiotherapy Strategy in Shoulder Adhesive Capsulitis after Breast Cancer Surgery: A Case Report

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Abstract

Background and Purpose: Breast cancer surgery may cause late effects of pain, range of motion loss, and activity limitation in the upper extremity (UE). The surgical complications was shoulder adhesive capsulitis (AC). AC is a condition of progressive loss of UE range of motion (ROM) and leading to limitations functional mobility. The purpose of this case report is to investigate the implementation of transcutaneous electrical nerve stimulation (TENS) combined with joint mobilization technique and hold relax technique for a patient with post mastectomy surgery and chemotherapy within a year with AC.

Method: The patient was a 55-year-old female who was referred to physical therapy, Dr. Sardjito Central General Hospital. The patient had restricted mobility and pain in her left UE with a medical diagnosis of AC. A comprehensive physical treatments have done as well TENS, joint mobilization technique, and hold relax technique for twice a week. The outcomes were measured by goniometer, manual muscle testing (MMT), visual analog scale (VAS) and shoulder pain and disability index (SPADI).

Result: The active ROM of shoulder increased significantly, decreased pain intensity (7/10 to 6/10) and increase muscle strength (3/5 to 4/5) and as well better functional performance (73.1% to 66.9%) in patient with AC affected by post mastectomy surgery.

Conclusion: A good physiotherapy strategy for post mastectomy, clearly reduced impairments as muscle strength, joint mobility and functional activities of shoulder joint. As well this study could be a reference for clinicians to manage the patients with shoulder problem after breast cancer surgery.

Keyword: Physiotherapy strategy, adhesive capsulitis, shoulder, breast cancer



Introduction:

Breast cancer is the most frequently diagnosed neoplastic disease in menopause women often leading causes a significant reduction of these women's functional ability [13]. According to epidemiological data, the number of breast cancer cases was 50% in women aged 50 to 69 years [22]. The average BMI was 24.37 kg/m², 5.05% with diabetes mellitus and 12.39% had hypothyroidism. The average weight of the breast lifted was 408.67 grams [8].

In a study were found 60% of breast cancer patients showed a reduction in shoulder flexion and abduction for 1 month after surgery and a 10% reduction in persistent ROM reduction within 12 months [12]. Shoulder ROM restriction can be caused by various conditions, such as adhesive capsulitis, pectoralis tightness, and radiation fibrosis [5]. Myofascial syndrome can also lead to the development of rotator cuff impingement syndrome. Limitation of the scapulohumeral joint characterizes this syndrome. Usually, there is external rotation and multidirectional motion. Myofascial syndrome can diminish activities of daily living and reduce quality of life [19].

Most of these breast cancer patients suffer from adverse effects and have serious complaints in their arm and shoulder complaints including decreased joint mobility and muscle strength, functional, pain, structural impairments in gross and fine motor skills, psychosocial disorders and cosmetic deformities that cause leading to limitations in activities of daily living and participation in work, sports, leisure activities, and social activities [18, 23].

The physiotherapy treatment can reduce complications associated with post-operative breast cancers. In addition, it has been revealed that the application of TENS is effective in reducing pain [4]. This patient assessment was carried out in several stages of evaluation of shoulder function, muscle strength around the shoulder, ROM and functional performance, evaluation of pain [9].

Method

A case report conducted to this study by exploring the effect of some interventions (TENS, joint mobilization technique, and hold relax technique) in a specific case of frozen shoulder affected by post mastectomy surgery. This study had been approved by Faculty of Health Sciences, Muhammadiyah Surakarta University (1292.4/C.8III/FIK/VIII/2021).

Case Presentation

A 55-year-old woman with a history of breast cancer within 1 year, left unilateral mastectomy surgery, and chemotherapy. The patient visited the physiotherapy clinic at Sardjito hospital at Yogyakarta. The patient complained about limited ROM and pain in the left upper extremity. The mastectomy operation was operated 12 months ago and the patient underwent 8 sessions of chemotherapy. According to medical records that have been filled in by surgeons and oncologists, the cancer stage is stage III.

The physical examination revealed limited ROM of the shoulder joint and spasm in the anterior deltoid and superior trapezius muscles. The goniometer was used to measure shoulder ROM. A study previously reported the goniometer had high to excellent reliability (ICC=0.88-0.97) [24]. Measurement of shoulder ROM determined the restriction movement of flexion, abduction, and external rotation of the shoulder. When the patient asked to move the shoulder, pain occurred at the end motion. Table 1 shows the results of the shoulder ROM assessment.

Table 1. The result of shoulder range of motion assessment

Movements	Active	Passive
Flexion	100	120
Extension	25	35
Abduction	85	100
Adduction	10	15
Internal rotation	25	30
External rotation	Painful	Painful

Other physical examination revealed that there was significant weakness in the shoulder muscles. The MMT was performed to identify the muscle strength. The MMT reliability was reported good to high with ICC=0.63-0.98 as well [6]. The results of muscle performances for shoulder joint are presented in table 2.

Table 2. The result of manual muscle test

Muscle	MMT Grade	Muscle	MMT Grade
Seratus anterior	3-	Pectoralis major	4
Trapezius	4	Deltoid	3-
Biceps	4	Medial rotators	3-
Triceps	4	Lateral rotators	Painful
Latisimus dorsi	4	Pectoralis minor	4

The patient was asked to describe the pain by asking the line on the VAS. The VAS is a 10 cm horizontal divided into 10 value, follows by 0 = no pain to 10 = maximum pain [2]. The VAS reliability was stated to be excellent (ICC=0.96-0.98) in previous study [15]. The patient stated severe pain in the left shoulder during overhead movements and was about 7 of 10. In addition, there was dull pain in the left shoulder that worsened with lifting and activities involved left hand. The functional ability examination used a shoulder pain and disability index (SPADI) questionnaire to measure pain and disability. The reliability of the SPADI was reported (ICC=0.59-0.82) [14].

Management and Outcome

The patient were given treatments twice a week. The treatment protocols are designed according to treatment goals such as reducing pain, increasing shoulder ROM, increasing muscle strength, and improving the patient's activities of daily living. Physiotherapy approaches were carried out in 3 ways, electrotherapy modalities, joint mobilization technique, and hold relax technique.

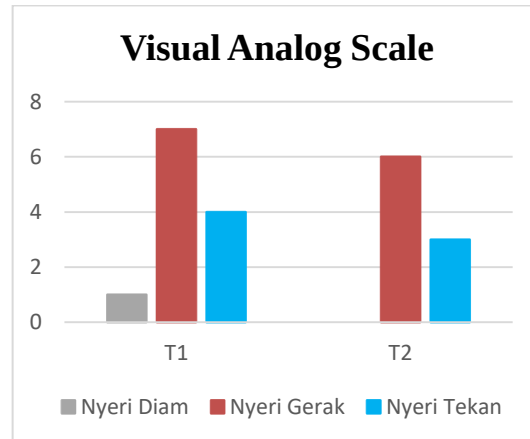
The electrotherapy was the first treatment. The conventional TENS was used for 15 minutes with a frequency of 150 Hz, pulse width of 20 seconds and intensity exclusively set at the subject's sensor threshold with electrodes in the left shoulder area [3]. The second treatment, joint mobilization technique consists of 3 kinds of glenohumeral glides is anterior, posterior, and caudal glides. The techniques with 2 seconds of glide/distraction and then a 2-second break [7]. And the last treatment was proprioceptive neuromuscular facilitation (PNF) with a hold relax technique on movement patterns of flexion, extension, abduction, and external rotation for 2 sets, 10 times, 15 seconds [1, 11].

The outcomes showed the positive effects of treatments, which the significant improvements for shoulder ROM, decreased pain, and increased muscle strength. To increase muscle strength, in a week of treatment was not enough, so the results did not indicate full recovery. In pain

examination, dull pain in the left shoulder during overhead movements, muscle stiffness in the upper limb was improved considerably. The feeling of heaviness in UE was quite reduced.



Picture 1. The result of visual analog scale (VAS)



Discussion

The previous studies explained that adhesive capsulitis showed global limitation and shoulder pain with synovial inflammation and capsular fibrosis. The risk factor for increasing adhesive capsulitis is mastectomy surgery. After a mastectomy surgery, pain mechanisms, scar formation, muscle weakness, protective posture, and soft tissue tension after surgery to a greater extent can lead to limited range of motion and changes in shoulder girdle alignment [10, 21]. The biomechanics changes of the shoulder girdle movement and muscle performance can cause impingement and pressure on the joint capsule, resulting in adhesive capsulitis. The development of adhesive capsulitis also affects degenerative by age in individuals undergoing treatment for breast cancers [20].

The physiotherapy approaches were carried out for reducing shoulder pain, tightness, increasing ROM, muscle strength, and facilitating tissue healing while avoiding the possibility of malignant tumor growth in improving quality of life, improving functional ability and reducing psychological distress for patient. Physiotherapy treatment in these patients suffering from cancer is almost different from common patients. Application of some modalities such as thermal modalities are contraindicated because of potential concerns that they may raise the rate of growth of malignant tumors. For example, it is better to avoid using thermal modalities because heat can increase cell metabolism thus causing cell division [16].

The electrical stimulation treatment is one methods that recommended to reduce pain. It is applied allowing consistent and accurate quantitative management of intensity, duration, and frequency for pain areas. The TENS was able to reduce pain, increased joint ROM, and also escalated the functional capacity. Electrical stimulation causes repetitive muscle contraction and relaxation, such that the microenvironments of the muscle cells were controlled to maintain the homeostasis of cellular osmotic pressure and promote the decomposition of pain-causing substances [3].

The joint mobilization technique used to inhibit tissue resistance, reduce pain, improve periarticular muscle performance, and increase ROM in flexion, extension, abduction, and rotation of the shoulder. The effect of joint mobilization techniques on shoulder ROM restriction in post unilateral left mastectomy surgery can achieve increased ROM, reduce pain, and improve functional activity ability [7].

The hold relax technique increased the amount of efferent muscle contractions by promoting the elongation of soft tissues. Hold relax technique in patients with adhesive capsulitis had an



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Conclusion

A good physiotherapy strategy was able to reduce impairments in individuals with frozen shoulder affected by post mastectomy surgery and chemotherapy. As well able to promote the functional ability of patient. Might this study can be a good perspective for other researchers to develop research by adding the number of participants, and do the psychometric properties for some physical examinations to support the study further. As well can be a good reference to clinicians when faced with post mastectomy surgery.

Acknowledgments

We would like to thank to a great participant who involved in this study. The special thanks to our advisor Lect. Dwi Rosella Komalasari, M.Fis., Sp.Vest for her guidance during this study.

Conflict of interest:

No conflict of interest views in this study

Funding support:

This project had no external funding, and no financial or other relationships

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